

Darwin and Wiesner (*Die heliotr.* Erscheint. 1878-80), namely, that *heliotropic movements may become fixed by growth*.

That growth is rhythmic, and not continuous was known already to Ingenhous and Th. de Saussure. We know that "growths that start together" are by *no* means likely to rest together, for although the question of individual differences has never been much studied, we are, in our studies, always troubled with individual variations.

The cause of the polarity is light; polarity may be changed, in *growing* leaves, into the fixed, normal light-position, when surroundings are changed; *grown* leaves will continually stay in the position of polarity. All that is needed to demonstrate this is a couple of drain pipes.

II. The twisting of leaf-blades was investigated by Wichura (*Flora*, —: 33. 1852.); since which time, these movements have not been much studied.

In monocotyledons, torsion of the leaves to the right takes place, when the scape is leaf-bearing, otherwise the leaves twist to the left. The list following shows some observations which I made in 1889.

Torsion to the right occurs in *Allium* (some); *Bromus*; *Triticum*; *Secale*; *Hordeum*. Torsion to the left occurs in *Fritillaria*; *Allium* (some); *Festuca*; *Avena* (upper leaves).

It has never been proved that growth is the primary cause of these movements, for an elimination of heliotropism by means of the clinostat has never been made. The twisting of leaves in *Gramineæ* is of much systematic value, and says ten times more than a thousand synonyms in a description.—J. CHRISTIAN BAY, *Des Moines, Iowa*.

"Minnesota Botanical Studies."

As editor of *Minnesota Botanical Studies* I regret that my selection of articles for its pages should, even in a single case, fail to meet with the approbation of Mr. F. V. Coville. My collaborateur is good enough not only to offer some useful statements of personal opinion, for which he has our thanks, upon certain debatable questions considered by Mr. E. P. Sheldon in a recent paper, but also to convey to me, through the *GAZETTE*, suggestions concerning what I may not without impropriety publish in the special journal entrusted to my care. Perhaps I may venture to note that *Minnesota Botanical Studies* does not hope to say the last word upon any of the matters touched upon in its columns. It is the opinion of the editor that even such preliminary contributions as he understands Mr. Coville to condemn are of value to him in the prosecution of the work he has in hand.

So far as *Minnesota Botanical Studies* is concerned, since it is supported by a Minnesota enactment, since it is a Minnesota work that it principally desires to do and since it is the wish of the editor that it be sent without price to whoever might be supposed to care for it, I hope no one will feel defrauded if some of its articles, from his broadly national point of view, seem too local and of too restricted interest for publication.

In the case in hand, while Mr. Coville's opinion of what the Minnesota survey should publish at a given moment and what it should retain in manuscript and how these manuscripts should be used, is of interest, I trust he will pardon me for suggesting that even the most unusual critical powers may be in danger of deterioration if dissipated over too wide a territory.—CONWAY MACMILLAN, *Minneapolis*.